DRAFT

F.6 AR 264

CLOSURE PLAN

NORTH LITTLE ROCK

East "Forty"

Received 8/17/83
DS

Purpose: This study was developed to determine whether there were residues remaining from previous operations that had the potential for producing adverse effects on the surrounding environment, and to recommend a suitable closure plan for the site with respect thereto.

Background:

The Olin Corporation owns an industrial complex located in North Little Rock, Arkansas parts of which are scheduled for demolition. The location is zoned industrial and is surrounded by various fertilizer plants, trucking firms, and agricultural processors.

Present on the property are a sulfuric acid plant, a pesticide formulating facility, a fertilizer formulating plant, and a pesticide quality control lab/research center. All of the facilities except the lab have discontinued operations and all facilities except the lab and fertilizer plant will be demolished.

The entire property totals 34 acres of which about one-third is undeveloped. This portion is located in the eastern section and referred to as the east "forty". Approximately one acre of the east "forty" was used for the land disposal of plant wastes--mostly sulfur spill cleanup and pesticide wastes. It is estimated that approximately 100 tons of pesticide wastes were disposed of in the east "forty".

Cotton dusts were the principle products prepared at the pesticide facility. The major ingredients were sulfur, Technical BHC, DDT, and toxaphene. Also used in lesser quantities at various times were aldrin, dieldrin, and chlorodane. A complete list is contained as attachment 12.

Investigation:

Olin undertook an investigation to determine whether residues from past operations could result in harmful migrations of hazardous constituents into the surrounding environment via air, surface water, or groundwater, or whether they posed a threat by incidental contact. Although no records were available, information was obtained from interviews with knowledgeable current and former employees.

In the sixties, pesticide wastes from the formulating operation were disposed of by burial. Although the formulation operation ceased in the mid-sixties, the pesticide quality control and research lab continued to operate and dispose of retain samples by burial until 1979. Normally a bulldozer was used to dig a trench approximately eight feet deep which was left open until filled with wastes at which time a new trench would be started. Seven disposal trenches are believed to exist. Four have been confirmed by aerial photographs while the others were identified in the field in 1979. Approximate locations are shown on attachment 1.

The U.S. EPA has conducted two inspections of the disposal area in the east "forty" as a result of Olin's superfund notification, (see attachment 2). The first was a general assessment by questions and visual inspection. The second involved split sampling of the monitor wells and of ditch sediments. Results of EPA's sample analyses are not yet available from the agency.

To obtain information on the extent and degree of contamination resulting from waste disposal activities, a survey program was conducted in the east "forty". The survey consisted of taking surface soil samples,

core samples to 16 inches, rainfall runoff samples, and visual observations. Sample points are identified on attachment 3. The analytical results for samples showing various levels of contamination are tabulated in attachment 4.

The soil and waste sample analysis results confirmed the presence of pesticides on the surface in certain areas. Water extractions of the core samples contained only very small amounts of BHC and DDT. While sediment samples in the stormwater drainways contained levels of pesticides similar to that found on the disposal area surface, only trace amounts of BHC and DDT were found in the stormwater. The pesticide presence in ditch sediments is the result of suspended insoluble solids being washed by rainfall runoff from the formulating and/or disposal areas into the adjacent ditches. These results were expected due to the relative insolubility of the pesticide compounds. The presence and location of pesticide residues was confirmed through this survey. Contaminant migration via surface and/or groundwater was monitored by additional programs.

A stormwater monitoring program was established to determine if significant amounts of contaminants were migrating off-site via rainfall runoff. Drainage is conveyed from the east "forty" by ditches on the northern, eastern, and western fringes. These are confluent, eventually flowing north into a large drainage ditch which turns south and drains to the Arkansas River. Drainage and sample points are identified on attachment 5.

In this program, the drainage ditches were sampled during significant rainfalls and analyzed for relevant parameters. These parameters and results of the program are listed in attachment 6. No significant concen-

trations of pesticides were detected in stormwater flow which indicates that the compounds are relatively immobile with the only significant movement being by sediment transport.

Complementary to the stormwater monitoring program, another program was established to evaluate subsurface migration of contaminants by way of the groundwater. This program was also utilized to determine the site geology and subsurface hydrology. A soil horizon, as presented in the monitor well geotechnical report, depicts a surficial clay layer about six to ten feet in thickness underlain by a sand stratum. Groundwater flow was determined to be southernly towards the Arkansas River, the probable discharge point.

Monitor wells were installed to be 30 feet deep and were screened between 15 and 30 feet in a saturated sand stratum. The wells were located downstream from the disposal area so they would intercept any contaminants emanating therefrom. Well locations are identified in attachment 7. These wells have been monitored quarterly for three quarters and lab analysts have detected small levels of pesticide compounds. Monitor well results are listed in attachment 8.

Results of the last round of samples demonstrate a significant reduction in pesticide concentrations. Because of this reduction, previously higher concentrations are suspected to be due to contamination induced from the well drilling and installation.

A calculation of potential migration off-site via groundwater gives a maximum of 11 pounds per year of pesticides leaving the site. This determination was made using the average total pesticide concentration in the three wells with the highest values and the maximum

potential flow rate.

Finally, to determine if there were emissions of pesticides to the air, samples were taken immediately downwind from the area with highest pesticide levels. Even though there were perceivable organic odors in some portions of the area, no detectable levels of pesticides were found. This indicates there is no significant migration through this route.

Investigative Findings:

The presence of buried pesticide wastes and limited contamination of the soils surrounding the burial sites was confirmed. All of the pesticides determined to be present on-site are relatively insoluble in water as reported in the literature. This fact was supported by the low concentrations of these substances found in the stormwater and groundwater samples which in turn reflect a very limited potential for off-site migration. Also, the site is located in an industrial area and no drinking water wells are in the vicinity.

Calculation of potential off-site migration via groundwater based on the geological findings and the observed levels of contaminants in the groundwater gave a value for the maximum total pesticide transport of 11 pounds per year.

Calculation of the potential off-site migration via rainfall runoff based on climatological data and the observed levels of contaminants found in the runoff samples gave a value for the maximum total pesticide transport of 5 pounds per year.

Analyses of sediment samples from the drainage ditches indicated that there was some on-site migration of contaminated soil by suspended

solids entrained in rainfall runoff being deposited in the ditches.

Air sampling results indicated that there were no detectable concentrations of contaminants in the air although there were portions of the area with a perceptible organic odor.

Some portions of the east "forty" were found to contain significant concentrations of pesticides at the surface with the potential for incidental human contact.

Closure Options:

The following discussion describes the possible remedies for the east "forty" disposal area. Closure actions evaluated were no action, slurry wall, clay cap, waste removal, removal of various contaminated soils, and groundwater monitoring. Groundwater recovery and treatment was not considered in this evaluation. Of all the alternatives, only the slurry wall does not appear to be technically feasible due to the 90 foot depth of the sand strata. If it were feasible, this option becomes prohibitively costly. The cost of each closure action has been estimated and is listed in attachment 11.

The individual closure actions may be chosen and arranged in several possible scenarios. Two basic closure approaches may be taken. One involves the removal of waste pesticides from the known disposal trenches, while the other is a non-removal option. The closure actions for each approach are identified below:

Non-Removal Option:

1. Remove contaminated sediment from ditches and place on east "forty" to be covered by cap. $ 5M

	Cost
2. Cap disposal trench area and sediment from ditches with a clay cap.	$80M
3. Continue groundwater monitoring indefinitely -	
10 year cost.	$264M
(20 year cost.	$554M)
	$349+M
	($639+M)

Waste Removal Option:

1. Remove pesticide wastes from known disposal trenches and dispose of in secure landfill	$125M
2. Remove contaminated sediment from ditches and place on east "forty" to be covered by cap.	$ 5M
3. Cover disposal trench area with day cap	$ 80M
4. Continue groundwater monitoring for 5 years	$132M
	$342M

Certain closure actions are contained in each closure option, i.e., sediment removal and capping. The removal of sediment from the ditches will eliminate the potential transport of contaminated soil by entrainment in rainfall runoff, reduce the amount of contaminated soil available to incidental contact and maintain proper drainage.

In both options, the clay cap is designed to cover known disposal sites and contaminated surface areas.

Although contained in both closure options, the monitoring proposed is of significantly different time intervals. In the removal option, because only low levels are now present and the significant sources are to be removed, a finite monitoring period not to exceed five years is deemed appropriate. The monitor wells were previously installed as part of the ground-

water assessment phase and will not be an expense during closure.

The non-removal option leaves significant deposits of waste on-site which at the present time do not pose significant threat to the environment. However, the continued presence of these deposits require that the groundwater monitoring program be continued indefinitely as a precautionary measure if the non-removal option is selected.

A cost comparison between the removal vs. non-removal options shows waste removal as being least costly. The main difference being the continuing cost of groundwater monitoring.

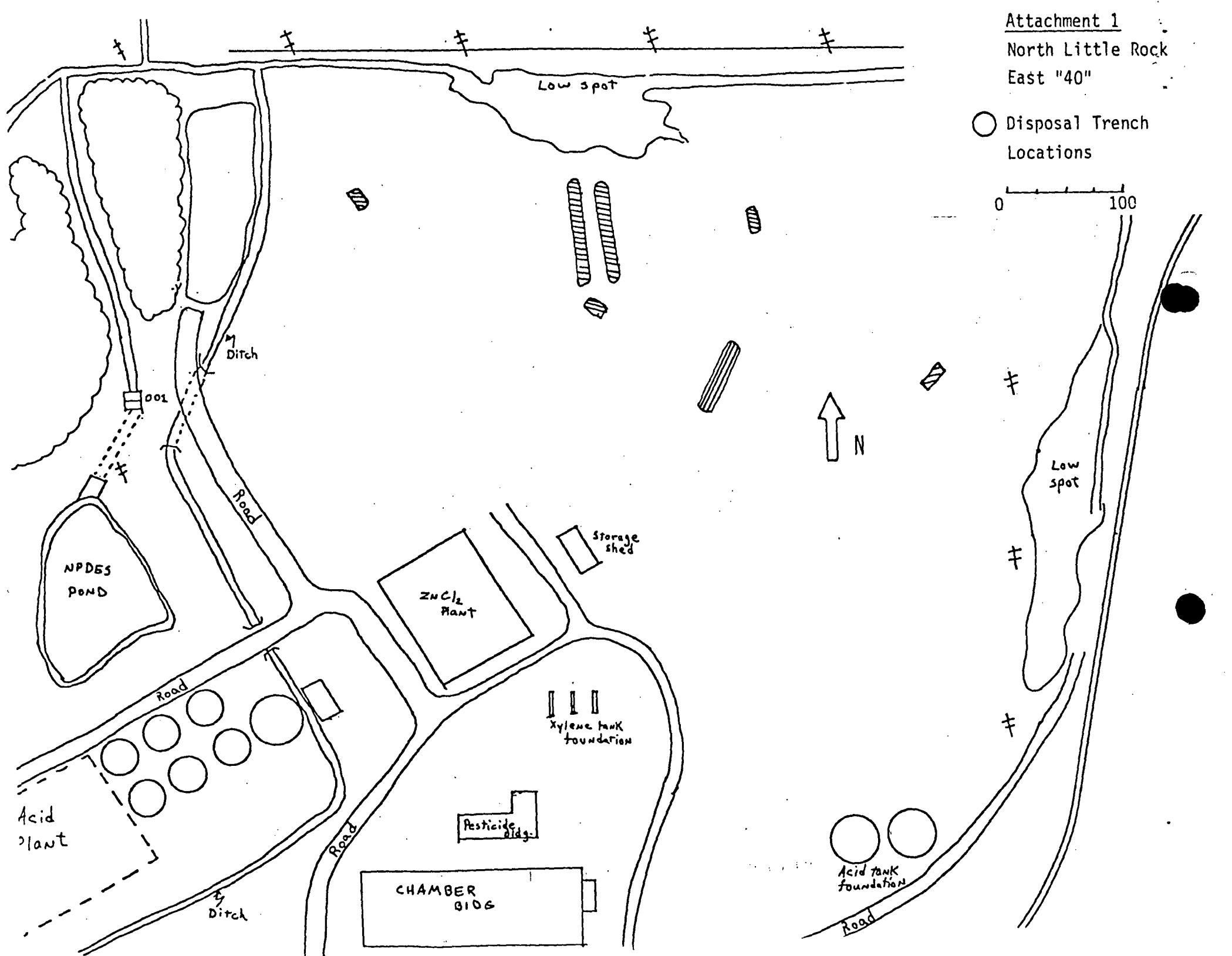
Closure Recommendations

Based on the preceding findings and determinations, it is recommended that the waste removal option be implemented in the east "forty" as follows:

1. All known pesticides in disposal trenches should be removed and disposed of in an off-site secure landfill. This action will eliminate these trenches as being significant sources of potential migration of contaminants.
2. Sediments are to be removed from drainage ditches and courses and placed on the area to be capped. The drainways are to be configured and graded to minimize erosion and the containment of standing water. Ditches and drainways from which sediments are to be removed are shown on attachment 9.
3. The pesticide disposal area as delineated on attachment 9 be covered by a clay cap to isolate the contaminated area from incidental human contact, from contact with rainfall, and to limit groundwater contact

by decreasing the amount of rainfall percolating through the contaminated strata. The cap should consist of 12 inches of compacted clay with a permeability of $< 10^{-7}$ cm/sec overlain by 12 inches of soil capable of supporting vegetation and seeded. The cap should be contoured to prevent ponding water and erosion. Dimensions of the area to be capped are approximately 600 x 250 feet as shown in attachment 9.

4. The groundwater monitoring program now in progress should be continued for five years.
5. A determination should be made of the appropriate entries to be made in the property deeds of record regarding the residual contamination and future site use.
6. The closure plan should be coordinated with the State and EPA prior to implementation.


Attachment 1
North Little Rock
East "40"
Disposal Trench Locations
0
100
Low spot
Ditch
001
Road
NPDES POND
ZnCl2 Plant
Storage shed
Xylene tank foundation
Acid Plant
Pesticide bldg.
CHAMBER BLDG
Ditch
Road
N
Low spot
Acid tank foundation
Road

EPA Notification of Hazardous Waste Site

United States
Environmental Protection
Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

Attachment 2

A Person Required to Notify:

Enter the name and address of the person or organization required to notify.

Name: Olin Corporation
Street: 120 Long Ridge Road
City: Stamford State: CT Zip Code: 06904

B Site Location:

Enter the common name (if known) and actual location of the site.

Name of Site: North Little Rock Plant (landfill)
Street: 2200 East 5th Street
City: North Little Rock County: Pulaski State: AR Zip Code: 72115

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title): Brown, J.C., Mgr. Environmental Technology
Phone: 615/336-2251 Ext. 3308

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year): 1950 To (Year): 1977

Waste Type: Choose the option you prefer to complete

Option I: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify)

_____
_____
_____

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

_____
_____
_____

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

P037		
U061		
U036		
U129		
P123		
P004		

Form Approved
OMB No. 2000-0138

EPA Form 8900-1

Notification of Hazardous Waste Si[redacted] Side Two

Waste Quantity:

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

tons ~~cubic feet~~ 100

gallons _____

Total Facility Area

square feet _____

acres 1.0

G Known, Suspected or Likely Releases to the Environment:

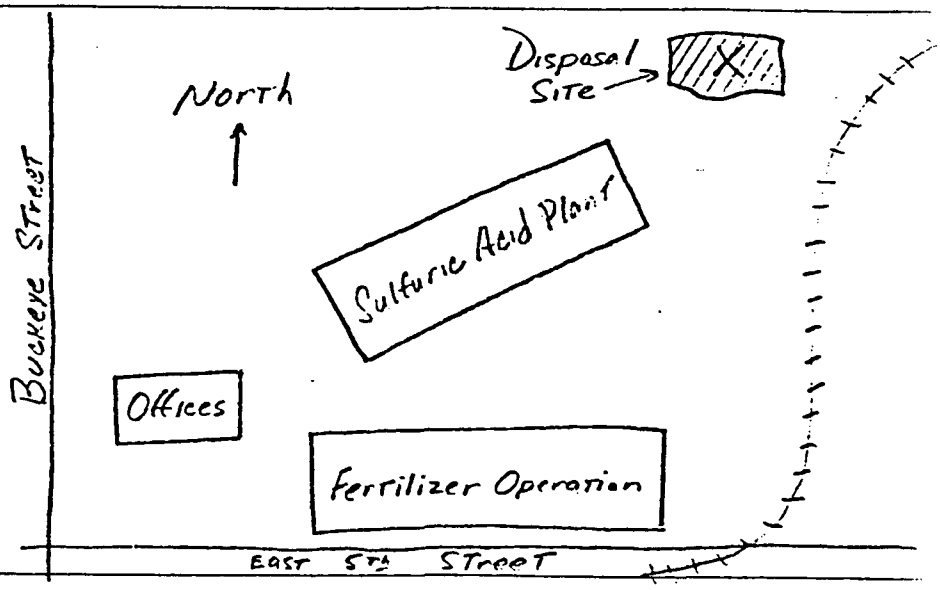
Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☒ Likely ☐ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessi hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.



Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

The site was used from 1950 for the disposal of waste materials, primarily sulfur and insecticides. Approximately 100 tons of waste insecticides were disposed of from 1951 to 1958.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other".

Name Verrill M. Norwood, Jr.
Director, Environmental Affairs

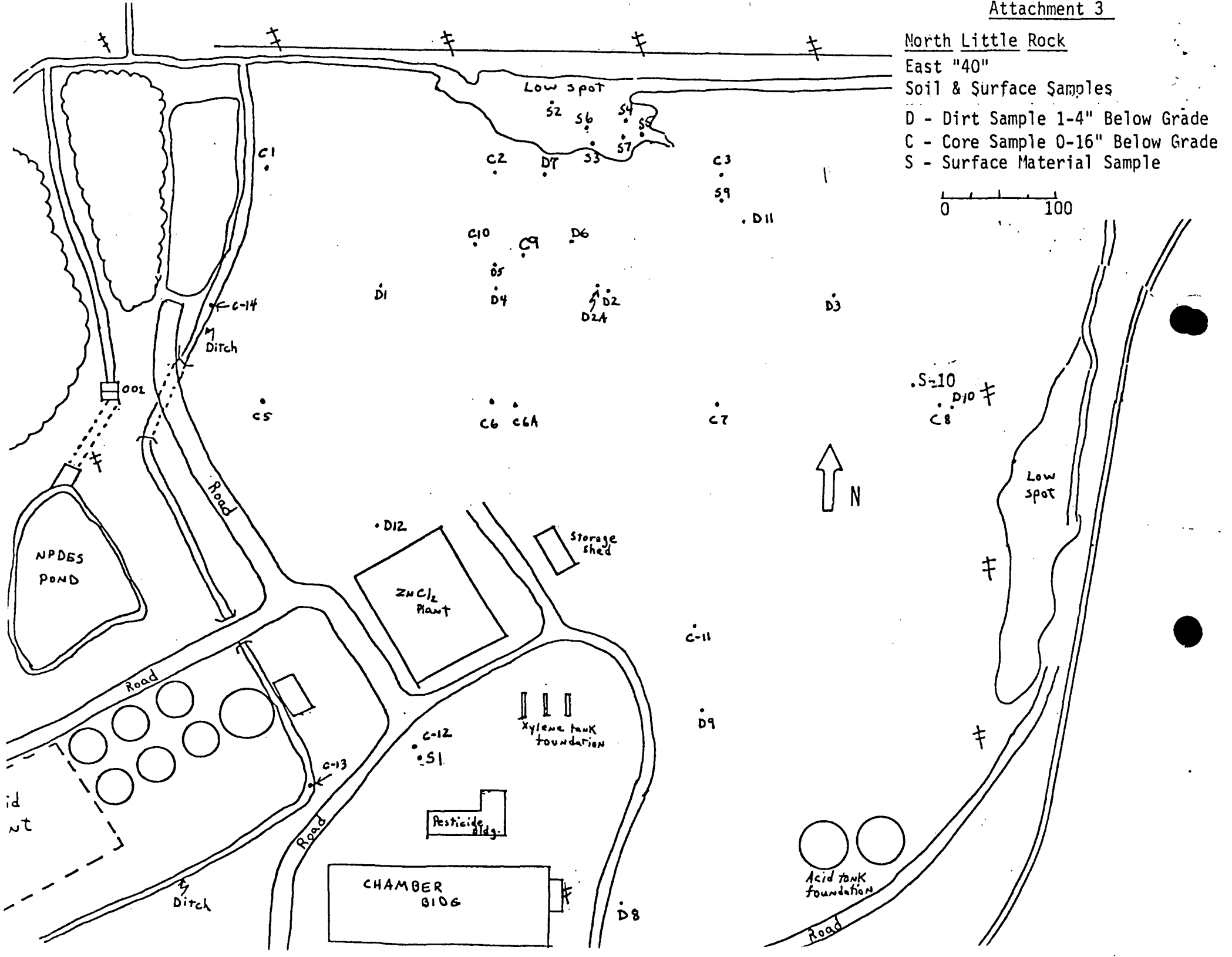
Street P.O. Box 248

City Charleston State TN Zip Code 37310

Signature Verrill M. Norwood Jr. Date 5/29/81

- ☒ Owner, Present
- ☐ Owner, Past
- ☐ Transporter
- ☐ Operator, Present
- ☒ Operator, Past
- ☐ Other

Attachment 3



Attachment 4

NORTH LITTLE ROCK SAMPLING PROGRAM

DIRT SAMPLES

PESTICIDE	CONCENTRATION (ppm) IN SOIL												
	D1	D2	D2A	D3	D4	D5	D7	D8	D9	D10	D11	D12	D13
α-BHC	34	213	560	7	32	0.6	336	4	0.5	0.9	34	1	ND
γ-BHC	33	224	220	6	42	6	423	4	0.1	0.8	13	0.01	ND
β-BHC	8	30	480	5	12	1	90	6	0.7	0.8	7	0.1	ND
δ-BHC	80	408	845	21	84	14	756	16	0.1	1	20	0.6	ND
Heptachlor	0.5	0.4	ND	ND	0.6	ND	4	ND	ND	ND	1	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND
Chlordane	3	27	13	ND	ND	ND	59	ND	ND	ND	7.5	ND	ND
Dieldrin	ND	ND	ND	ND	P	2	98	ND	ND	ND	ND	ND	ND
Aldrin	3	14	ND	ND	6	ND	29	ND	ND	ND	ND	ND	ND
Toxaphene	P	P	P	P	Trace	P	P	ND	P	ND	P	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p,p'-DDE	9	63	150	4	21	0.6	144	28	2	4	12	ND	0.5
p,p'-DDD	72	380	1345	250	128	22	1161	81	1	21	101	0.7	1.5
p,p'-DDT	55	296	985	174	55	14	9900+	19	0.8	9	66	0.5	0.6

ND = Not Detected
P = Present (not quantitated)

Attachment 4

NORTH LITTLE ROCK CORE EXTRACTS

CONCENTRATIONS IN PPM IN SOIL

EPA PROCEDURE F.R 43,(243),58946, 12/18/78

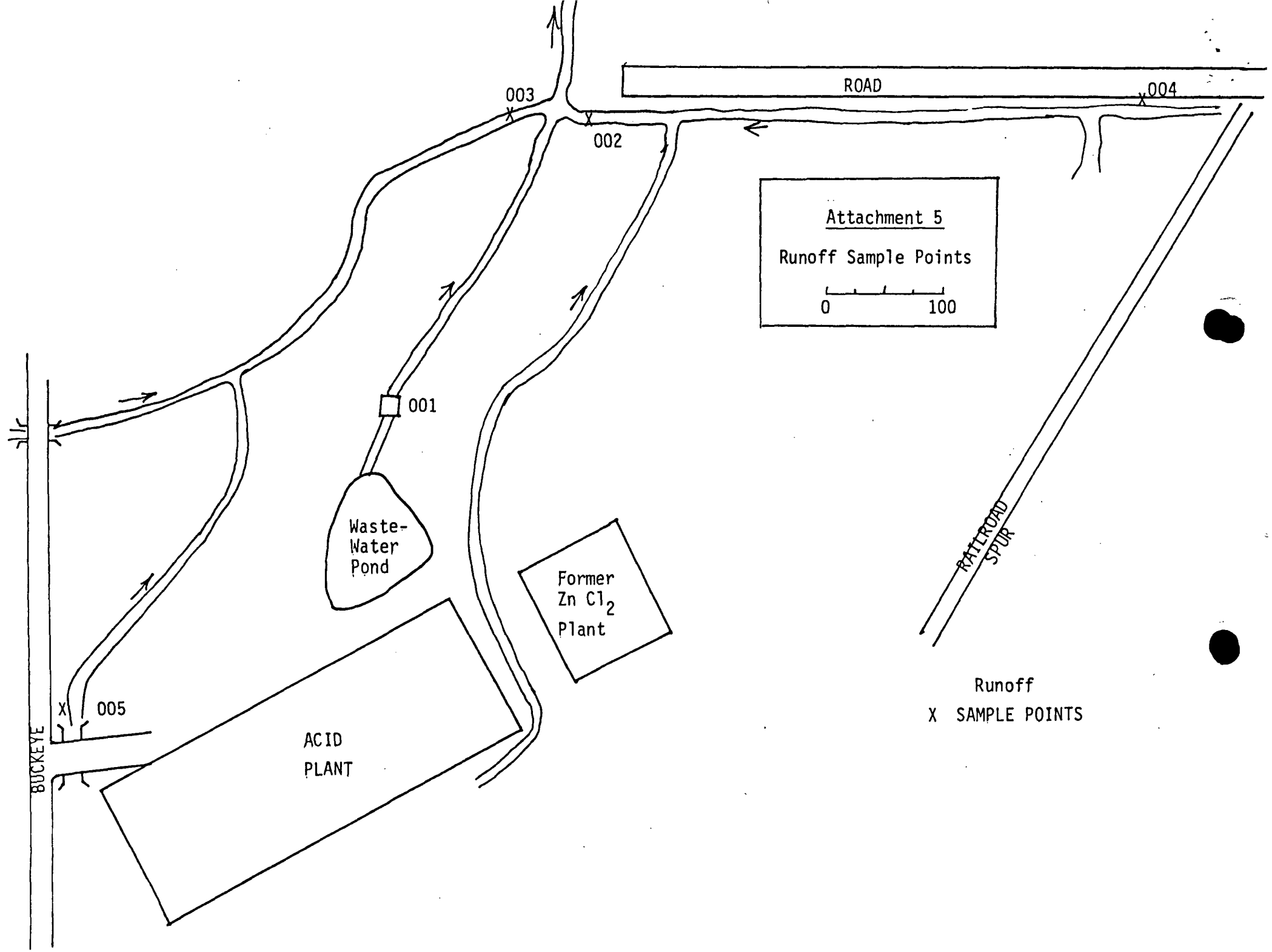
CORE #	APPROX. DEPTH OF CORE	WGT. OF SOIL USED (GM)	α-BHC	β-BHC	γ-BHC	δ-BHC	ALDRIN	DIELDRIN	p,p'-DDE	p,p'-DDD	p,p'-DDT	TOXAPHENE
C1	10" Upper	100	1.1	2.3	0.4	1.2			0.007	0.07	0.5	
	Lower?	100	1.6	4.0	0.3	3.7						
C2	12" Upper	100	0.7	1.0	0.04	0.0				0.001	0.002	
	Middle?	96.4	1.4	1.4	0.04	0.2						
	Lower	103	0.4	0.5	0.03	0.2				0.004	0.007	
C3	12" Upper	96.6	0.8	0.2	0.02	0.04			0.002	0.02	0.01	
	Lower	100	0.05	0.1	0.001	0.04					0.002	
C4	12" Upper	100	0.04	0.05								
	Lower	100	0.02	0.03								
C5	12" Upper	100	0.1	0.3	0.1	0.2						
	Lower	100	0.3	0.5	0.09	0.5				0.02	0.03	
C6	5"	100	1.5	2.5	0.2	1.0						
C6A	7" Upper	100	6.6	7.5	0.4	4.2						
	Lower	100	11.4	13.2	1.4	9.1					0.05	
C7	12" Upper	100	0.03	0.02	0.01				0.006	0.02	0.01	
	Lower	100		0.4	0.2							
C8	5"	100	2.2	0.6	0.3	0.5	0.4	0.3		0.03	0.05	
C9	6" Upper	100	0.2	0.3	0.003	0.07						
(from depth 8"-14")	of lower	100	5.5	4.1	0.2	0.5				0.01	0.01	

NORTH LITTLE ROCK CORE EXTRACTS

CONCENTRATIONS IN PPM IN SOIL

EPA PROCEDURE F.R 43,(243),58946, 12/18/78

CORE #	APPROX. DEPTH OF CORE		WGT. OF SOIL USED (GM)	-BHC	-BHC	-BHC	-BHC	ALDRIN	DIELDRIN	p,p'-DDE	p,p'-DDD	p,p'-DDT	TOXAPHENE
C10 (from depth of 22"-30")	8"	Upper	100	1.6	1.9	0.6	1.8			0.7	1.8	1.3	Detected
		Lower	100	0.09	0.14		0.05						
C11	8"	Upper	100	1.1	0.9	0.02	0.06	0.007			0.06	0.1	
		Lower	100	0.5	0.4	0.004	0.01				0.01	0.03	
C12 (from depth of 11"-22")	11"	Upper	100	0.4	0.6		0.3						
		Lower	100	1.4	1.4	0.04	0.2						


ROAD
003
002
004
001
Waste-
Water
Pond
Former
Zn Cl2
Plant
ACID
PLANT
005
BUCKEYE
RAILROAD
SPUR
Attachment 5
Runoff Sample Points
0
100
Runoff
X SAMPLE POINTS

Attachment 6

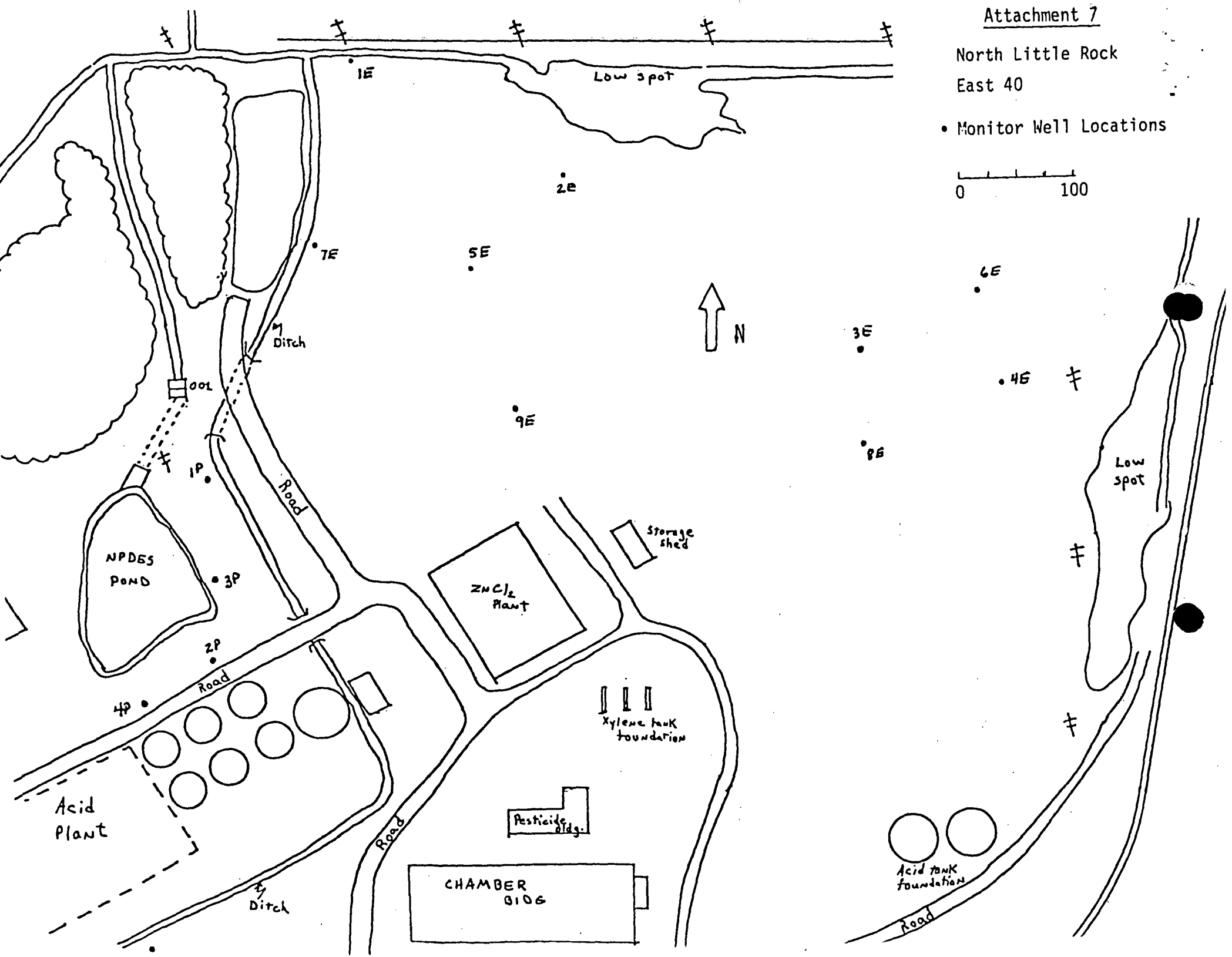
Results of Stormwater Monitoring Program

	Sample Identification	Parameter mg/l (ppm) 1	2	3	4	5	6	7	8
First Quarter September 1981	002-A	0.010	ND	ND	ND	15.9	31.9	.158	
	002-B	0.012	ND	ND	ND	-	-	-	
	003	ND	ND	ND	ND	25.7	8.8	.015	
	004-A	ND	ND	ND	ND	3.8	5.5	.065	
	004-B	ND	ND	ND	ND	-	-	-	
	005	ND	ND	ND	ND	8.4	5.7	.025	
Second Quarter February 1982	002	0.006	ND	0.0016	ND	9.2	10.35	.162	2.0
	003	ND	ND	ND	ND	12.3	.88	.012	2.3
	004	ND	ND	ND	ND	21.4	4.23	.012	2.4
	005	ND	ND	ND	ND	10.0	1.00	.047	2.3
Third Quarter May 1982	002	0.049	ND	0.038	ND	8.5	25.5	11	2.6
	003	0.016	ND	ND	ND	11.8	7.5	4	7.0
	004	0.002	ND	ND	ND	34.5	6.3	1	3.6
	005	ND	ND	ND	ND	7.3	3.5	47	2.7

*1 = lindane, detection limit = 0.004 mg/l (ppm)
*2 = endrin, detection limit = 0.0002 mg/l (ppm)
*3 = methoxychlor, detection limit = 0.100 mg/l (ppm)
*4 = toxaphene detection limit = 0.005 mg/l (ppm)
5 = TKN (Total Kjaldahl Nitrogen)
6 = TP (Total Phosphorous)
7 = Arsenic
8 = pH

ND - Not detected (no compound detected above detection limit)

*Samples were analyzed according to EPA procedures listed in "manual of Analytical Methods for the Analysis of Pesticides in Human and Environmental Samples" (sections 10A and 10B), USEPA, Health Effects Research Laboratory, Research Triangle Park, N.C. (June 1980).


Attachment 7
North Little Rock
East 40
• Monitor Well Locations
0
100
1E
Low spot
2E
7E
5E
6E
N
3E
Ditch
001
4E
9E
8E
1P
Road
Low spot
NPDES POND
3P
Storage shed
ZnCl2 Plant
2P
Road
4P
Xylene tank foundation
Acid Plant
Pesticide bldg.
Road
CHAMBER BLDG
Acid tank foundation
Ditch
Road

Attachment 8

OLIN NORTH LITTLE ROCK
MONITORING WELLS DEC. 1981

Pesticide	Concentration (ppb)								
	Well #								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
α-BHC	34.3	659	16.6	8.9	206	10.4	388	8.6	7.7
γ-BHC	8.0	171	3.8	2.1	59.6	1.8	165	2.3	[redacted]
β-BHC	8.0	171	4.1	1.3	44.8	3.8	62.9	2.0	0.8
δ-BHC	50.5	797	10.4	3.1	335	3.6	510	4.9	3.0
Heptachlor					0.1				
Aldrin					0.7				
Chlordane									
p,p'-DDE		0.1	0.1		0.1		0.04		
Dieldrin		1.7	0.1		1.3		3.4		
p,p'-DDD		1.7			0.2		0.7		[redacted]
p,p'-DDT		13.6			0.1		1.7		
Toxaphene		Detected					Detected		

OLIN NORTH LITTLE ROCK
MONITORING WELLS JAN. 1982

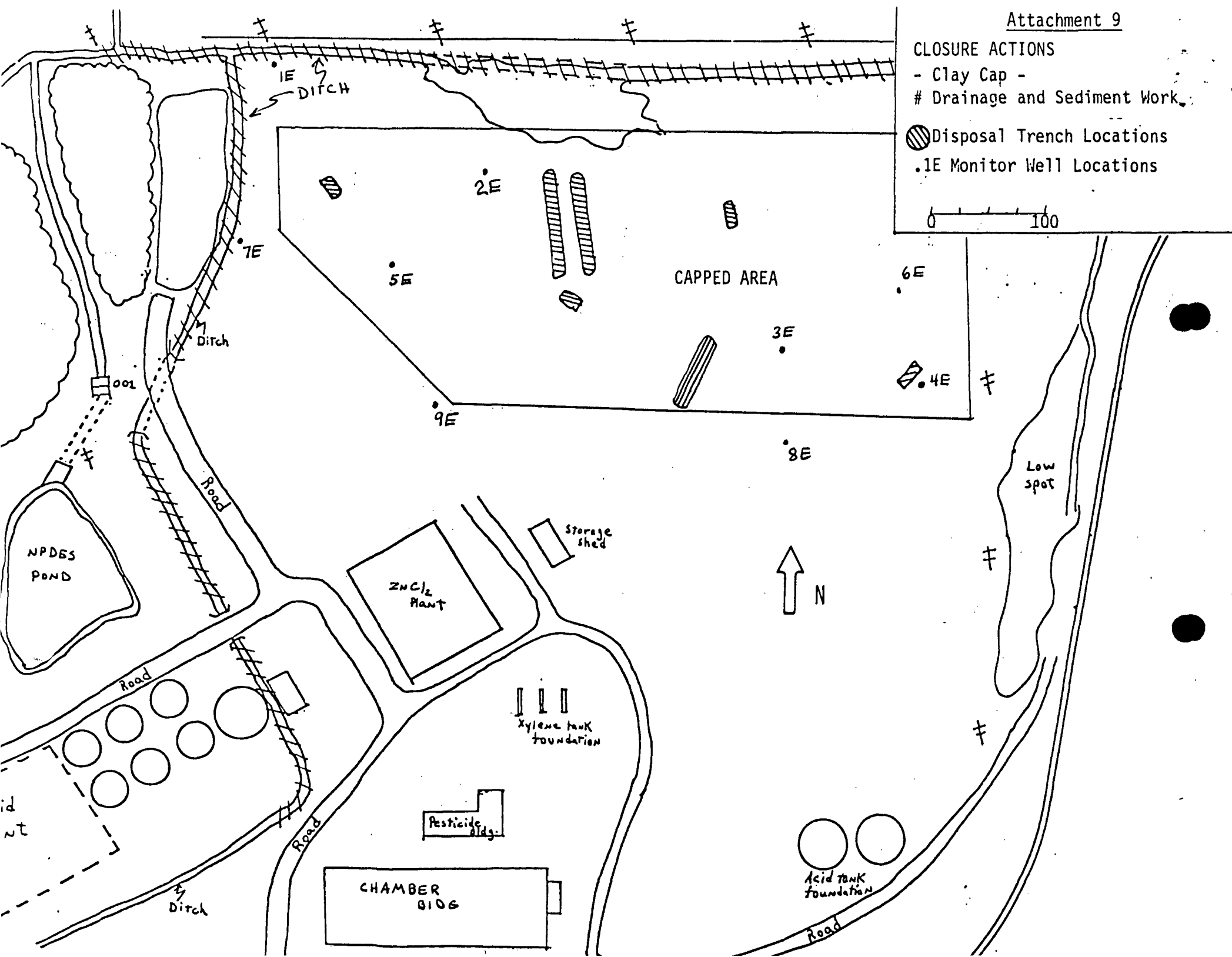
	1E	2E	3P	4P	5E	7E	8E	9E
				parts per billion				
α-BHC	15.4	1099	5.6	27.0	270	373	0.6	5.2
γ-BHC	14.0	932	7.9	34.8	274	691	0.7	3.5
β-BHC	3.8	191	0.5	2.9	55.1	49.2	0.1	0.4
δ-BHC	6.8	245	1.1	7.3	102	96.7	<0.01	0.5
Heptachlor								
Aldrin								
Heptachlor Epoxide								
Endosulfan		0.4						
Chlordane								
p,p'-DDE		71.9			0.3	0.5		
Endrin		0.7				4.6		
Dieldrin		6.8				3.6		
p,p'-DDD		41.5			1.3	2.9		
p,p'-DDT		113			2.8	7.3		
Toxaphene		34.1						

Attachment 8

OLIN NORTH LITTLE ROCK
MONITORING WELLS
Concentration in ppb
May-1982

	Plant Well	1E	2E	3E	4E	5E	6E	7E	8E	9E
α-BHC	0.7	0.9	36.7	0.8	0.6	43.0		23.0		1.7
γ-BHC	0.4	0.6	66.7	1.2	0.8	96.5		60.1		3.4
β-BHC	0.3	0.4	18.8	0.4	<0.1	15.5		4.3		0.5
δ-BHC	0.5	0.6	26.3	0.4	0.2	28.5		11.5		0.5
Heptachlor							Broken in Shipment		Broken in Shipment	
Aldrin		0.1			<0.1					
Heptachlor Epoxide										
Endosulfan*										
Chlordane			0.1							
p,p'-DDE		0.1	0.3	<0.1				2.7		
Dieldrin		0.1	0.2			0.3		0.6		
p,p'-DDD		0.2	0.9	<0.1	<0.1	0.2		0.5		
p,p'-DDT		<0.1	5.1	<0.1	<0.1	0.3		2.7		
Endrin										
Toxaphene										

*Endosulfan was not detected (even in standards) under the analytical conditions used.


Attachment 9
CLOSURE ACTIONS
- Clay Cap -
Drainage and Sediment Work
Disposal Trench Locations
.1E Monitor Well Locations
0
100
1E
DITCH
2E
7E
5E
CAPPED AREA
6E
3E
4E
9E
8E
Ditch
001
Road
NPDES POND
ZnCl2 Plant
Storage shed
N
Low spot
Road
Xylene tank foundation
Pesticide Bldg.
Road
CHAMBER BLDG
Acid tank foundation
Ditch
Road

Attachment 10

ESTIMATED PERMISSIBLE CONCENTRATIONS AMBIENT LEVEL GOALS DERIVED FROM MULTIMEDIA ENVIRONMENTAL GOALS (1)

	Water µg/l	Soil µg/g	Air µg/m^3
Aldrin	10	10	1
Benzene	50	50	10
α-BHC	100	50	20
β-BHC	1000	500	500
δ-BHC	400	100	100
γ-BHC	20	10	1
BHC(tech)	4000	1000	2000
Carbon tetrachloride	500	100	100
Monochlorobenzene	500	100	300
o,p'-DDD	2000	500	1000
p,p'-DDD	50	10	10
DDE	400	100	100
p,p'-DDE	400	100	100
o,p'-DDT	400	100	100
p,p'-DDT	30	20	10
Dieldrin	10	10	1
Endrin	10	10	1
Hexachlorobenzene	2000	1000	1000
Pentachloronitrobenzene	500	200	100
1,2,4,5-tetrachlorobenzene	500	200	100
toxaphene	20	10	1
1,2,4-trichlorobenzene	300	100	50
2,3,6-trichlorophenol	100	50	30
2,4,5-trichlorophenol	300	100	30
2,4,6-trichlorophenol	300	100	30
3,4,5-trichlorophenol	100	50	30

(1) EPA 600/7-77-136a, Multimedia Environmental Goals for Environmental Assessment, J. G. Cheland & G. C. Kingsbury, RTI, November, 1977.

Attachment 11

Summary of Closure Options

	Option	Cost	Technical Feasibility
1.	Slurry Wall	$500M	Poor
2.	Capping	$55M	Good
3.	Waste Removal	$125M	Good
4.	East "Forty" Soil Removal	$129M	Good
5.	Contaminated Sediment Removal/Off-site Disposal	$45M	Good
6.	Contaminated Sediment Removal/Left On-site	$5M	Good
7.	Groundwater Monitoring	$ 24M/Annual $132M/5 years $264M/10 Years $554/20 Years	Good

Attachment 12

LIST OF MATERIALS HANDLED AT NORTH LITTLE ROCK

Materials Formulated in Product Quantity

BHC - All isomers
DDT
Toxaphene
Calcium arsenate
Parathion
Chlordane
Strobane
Aldrin
Dieldrin
Endrin
Malathion
Heptachlor
Kerosene
Xylene
Ethylene glycol

Materials Handled in Sample Quantity

PCNB
Terrazole
Temik
Disyston
Dasmit
Timet
Methoxychlor
Carbofuran
Molinate
Ethoprop
Furmecyclox
Zinch
Rotenone
Endosulfane
Sodium Molybdate
Mevinphos